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R E M A R K S

The Office Action issued March 24, 2004 has been received and its contents have been carefully considered.

The applicants herein wish to thank the Examiner in charge of this application, Ms. Alexa Doroshenk, for the courtesy and cooperation she extended applicants' undersigned counsel during the telephone interview kindly granted on June 8, 2004. During this interview, applicants' counsel explained that two essentially similar specifications have been submitted in this application; namely:

(1) an English translation of the Patent Publication No. WO99/42208; and

(2) a translation of the amended pages under Article 36 which are attached to the International Preliminary Examination Report.

It is assumed that the Examiner has copies of both translations since (1) she kindly sent a copy of the English

specification that is on file to the undersigned attorney by telefax (this being the English translation of the amended pages); and (2) since the informality in the specification, noted in numbered paragraph 1 on page 2 of the Office Action, refers to an informality that appeared in the English translation of the aforementioned Patent Publication No. WO 99/42208. The informality on page 8, line 2, of that translation was indeed a typographical error since the original German text in the Publication No. WO99/42208 refers to the "reaction zone 62", not "67".

For the convenience of the Examiner, applicants submit a copy of the aforementioned Patent Publication No. WO99/42208 and the International Preliminary Examination Report (with amended pages under Article 36), both in German, and English translations of both (which are referred to above) for comparison purposes.

Turning to the claims, applicants have canceled all of the claims 1-20 which were previously submitted in this case by original application or by amendment and have substituted new claims 21-31. Claim 21 is substantially the same as the original claim 1 submitted in this case and amended by

Preliminary Amendment on August 16, 2000 and amended again by Supplemental Preliminary Amendment on October 31, 2000.

Claims 22-24 are identical to claims 2-4, respectively, originally submitted and amended by Preliminary Amendment on August 16, 2000.

Claims 25-29 are identical to claims 5-9, respectively, originally submitted and amended by Preliminary Amendment on August 16, 2000 and again by Supplemental Amendment on October 31, 2000.

Claims 30 and 31 are identical to claims 10 and 11, respectively, which were added on August 16, 2000 by Preliminary Amendment. Claim 30, (previously claim 10), was also amended by Supplemental Preliminary Amendment on October 31, 2000.

In summary, the Examiner has already reviewed and examined all of these claims. Only the claim numbering has been changed.

Turning now to the merits of this case, and to the Examiner's objections and rejections in particular, applicants submit herewith three sheets of informal drawings, containing a proposed revision of Fig. 5 (circled in red) and proposed new Figs. 6, 7, 8a and 8b. Applicants

wish to point out that Fig. 5 is identical to the Fig. 6 which was originally included in the aforementioned Patent Publication No. WO99/42208. This figure, together with proposed Figs. 8a and 8b, provide support for the subject matter of claim 28.

In addition, applicants propose to add Figs. 6 and 7 to provide support for claims 25 and 27, respectively.

The Examiner's approval of these proposed amendment to Fig. 5, and the proposed new drawings is respectfully requested. On the assumption that these drawings are acceptable, applicants have submitted both a brief description of these figures as well as a detailed description which tracks the present language of the specification and claims. Consequently, no new matter has been added.

Claim 20 stands rejected under 35 USC §112, first paragraph, for failure to provide support in the specification (numbered paragraph 6 on page 3 of the Office Action). Such support has indeed been provided in both the original and amended pages of the specification. In the original text, support is provided on page 7, lines 3-6, which state:

"Furthermore, the heat insulation layer, such as 46, for example, can be limited to partial areas of the tube plate, for example, the tube free zone or the edge area of the tube plate at the transition to the reactor jacket."

In the amended pages, the support is provided on page 9, lines 1-4 which state:

"Furthermore, the heat insulation layer 46 can be limited to partial areas of the tube plate 4 -- for example, the tube-free zone or the edge area of the tube plate at the transition to the reactor jacket."

Original claims 14 and 16-18, which were objected to in numbered paragraphs 4 and 9 of the Office Action, have been canceled and are not replicated in the new claims 21-31.

Claim 21, the only independent claim in this application, stands rejected under 35 USC §102(b) as being anticipated by the U.S. Patent No. 2,986,454 to Jewett. Insofar as this rejection may apply to the new claim 21, which is substantially identical to applicants' original claim 1, this rejection is respectfully traversed.

According to Jewett, the heat insulation zone is provided outside the area between the two main tube sheets (plates) 3,4, namely between secondary tube sheet 20 and the upper main tube sheet 3. Catalyst tubes 8 extend between the main tube sheets 3 and 4. Isolating tubes 23 extend

from the secondary tube sheet 20 into the catalyst tubes 8, and serve to conduct the incoming gas mixture into these catalyst tubes while avoiding contact with the hot main tube sheet 3 (Column 2, lines 31 to 39 of the patent).

This means, according to Jewett, the upper main tube sheet 3 is not the "cold tube sheet" but a hot tube sheet, and furthermore, the tubes extending between the lower main tube sheet 4 and the cold tube sheet 20 are formed of two pieces. The first pieces (isolating tubes 23) are attached to the secondary tube sheet 20 and to the second pieces (catalyst tubes 8) in a pivotable arrangement by tapered or rolled contact areas.

This type of construction has various drawbacks. This known construction is not only complicated and expensive because of the two-piece tubes between the lower main tube sheet and the cold tube sheet and the pivotable attachment between the two pieces of the tubes, but also it is more difficult to clean and refill the catalyst tubes because of the reduced inner diameter of the isolating tubes. Furthermore, the tapered and rolled contact areas between the isolating tubes and the cold tube sheet at one end and the catalyst tubes at the other end do not always provide

for a reliable gas-tight attachment, notwithstanding the statement in Column 2, lines 53 to 57 of the patent.

All of these disadvantages are overcome by the present invention, according to which (1) the tubes extend in one piece from the lower main tube sheet to the upper cold tube sheet, and (2) the heat insulation zone borders on the heat carrier side (circulating coolant bath) of the upper main (cold) tube sheet; i.e., the heat insulation zone is located between the two main tube sheets.

According to the present invention only single-piece tubes are used, so that the inner diameter of the tubes is constant from the lower main tube sheet to the cold (upper main) tube sheet. The tubes are sealed to the main tube sheets in a normal manner so that there is no danger of leakage therebetween. The construction is relatively simple and not expensive and can easily be purged and refilled.

Certain claims, namely claims 2, 3, 5, 8-16, 19 and 20, stand rejected under 35 USC §103(a) as being unpatentable over Jewett in combination with the U.S. Patent No. 5,820,655 to Gottzmann et al. This rejection is also respectfully traversed.

Gottzmann et al. disclose various embodiments of a reactor design. Of these, only the design of Fig. 1 is at all similar to applicants' tubular reactor for catalytic gas phase reactions.

As described in the patent in Column 6, lines 63-Column 7, line 13:

"The solid electrolyte ionic conductor reactor design of FIG. 1 features a tube and shell arrangement with a single tube sheet 21 on one end of the apparatus and two tube sheets 7 and 8 on the other end of the apparatus. The inside of shell 14 is thermally protected by insulation 15 and contains ion transport tubes 1 surrounded by shroud 3 and sealed and supported by o-ring seals 6. This sliding tube-to-tube sheet seal accommodates thermal and compositional dimensional changes in ion transport tube 1. Ion transport tubes 1 consist either of a dense wall solid oxide mixed or dual phase conductor or a thin film solid oxide mixed or a dual phase conductor supported by a porous substrate. The ion transport material must have sufficient ability to conduct oxygen ions and electrons at the prevailing oxygen partial pressure in the temperature range from 400°C. to 1100°C. when a chemical potential difference is maintained across the ion transport membrane surface caused by a ratio in oxygen partial pressures across the ion transport membrane."

In Gottzmann et al., not only is the reactor of a different design with a single tube sheet 21 at one end and two tube sheets 7 and 8 at the opposite end, but the ion transport tubes 1 are porous to oxygen ions, and serve as an

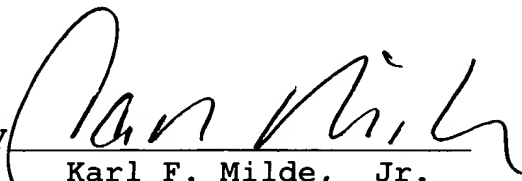
"ion transport membrane" for extracting oxygen from a feed gas stream. A reactant gas is passed along the outside of the ion transport tubes to react with the oxygen that passes therethrough.

Clearly, it would not be "obvious" to combine a Gottzmann et al. reactor with the catalytic gas phase reactor of the present invention since the two reactors operate completely differently and have a different purpose. Furthermore, even if structures of the two reactors were combined, this combination would not result in the reactor structure recited in applicants' claim 1.

In conclusion, applicants respectfully request that the attached figures be approved by the Examiner. Further, since all of the other formal matters raised in the outstanding Office Action have been overcome by this Amendment, and since claim 21, the only independent claim in this application, distinguishes patentably over both Jewett and Gottzmann et al. for the reasons given above, this application is believed to be in condition for allowance.

A formal Notice of Allowance is accordingly respectfully
solicited.

Respectfully submitted,

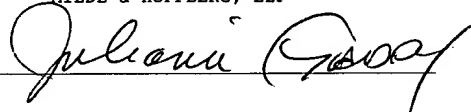
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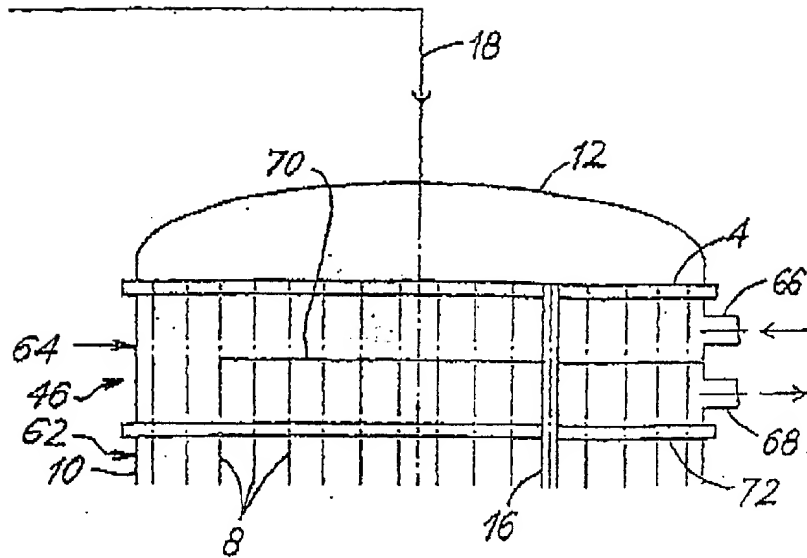


Fig. 4

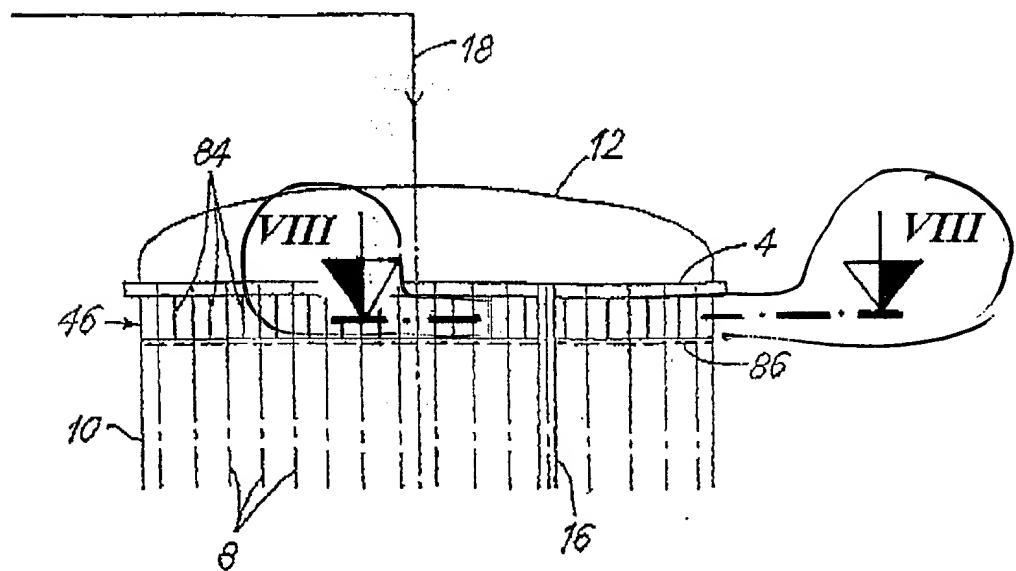


Fig. 5